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LOCKING DEVICE FOR VEHICLE RADIOS

By

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Mobility Branch

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Final Report

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Army field units expressed a need to prevent unauthorized removal of radios from military tactical vehicles. A key locking device was developed for the AN/VRC-12 family of radios which replaces one of the wing-bolt clamps which attach the radio to the radio mount. The radio mount is secured to the vehicle with special security bolts. Evaluations were conducted by Army field units, and the device was found to be acceptable.

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DESCRIPTION

The Locking Device for Vehicle Radios is a key-operated lock for use with the AN/VRC-12 radio family to prevent unauthorized removal. It replaces one of the radio hold-down clamps which fasten the radio to the mount. See Figure 1. The locking device functions in the same way as the standard hold-down clamp, except a special allen-head bolt is used, and access to the bolt is obstructed by the locking cylinder. See Figure 2. In addition, the radio mount is fastened to the vehicle with special security bolts which are difficult to remove; the heads break-off when tightened, leaving only a rivet-type head. The key cannot be removed from the lock cylinder when unlocked. Each lock is furnished with the following (Figure 3):

Locking Device. . . . . .1 ea.
Security Bolt, 5/16-18 x 1" Long . . . . . .5 ea.
Security Bolt, 5/16-18 x 1/2" Long . . . . . .5 ea.
Locknut, 5/16-18 . . . . . .5 ea.
Rollpin, 1/16" x 1/2" Long . . . . . .1 ea.
Bolt, Allen-Head, Special, 5/16-18. . . . . .1 ea.

The locks can be furnished in key-alike groups, or each key can be different. The locking cylinders may be removed, thereby deactivating the locks if desired. See Figure 2.

The Locking Device for Vehicle Radios is installed by first bolting the radio mount to the vehicle using the special security bolts supplied. The Locking Device is installed in place of the standard hold-down clamp and wing-bolt which are discarded. Based on a description of required characteristics, the device was developed by and procured from the Toepfer Lock Co., Milwaukee, Wisconsin.

EVALUATION

Seventy locking devices were sent to the 3d Armored Division in Europe. They were installed on VRC-46/VRC-49 (AN/VRC-12 family) radios mounted on M151 vehicles. The average installation time was 1/2-hour.

The evaluation period was 2 1/2 months. The locks fit and functioned as intended, and were considered an effective means to prevent unauthorized removal of the radios. See Appendix A. No incident of attempted unauthorized removal occurred during the evaluation period.

The removal of the security bolts which attach the radio mount to the vehicle was a maintenance problem. The security bolts can only be removed by drilling and use of an extractor.

DISCUSSION

No tests were made of the time required to defeat the lock. However, the lock is the same type used in telephone coin boxes, and has not often been defeated by picking. The keys are not easily duplicated without a special machine. Attempted removal of the locked clamp by force would deface the radio. Since the problem is primarily to maintain control of the radios and to prevent unauthorized diversion - rather than actual theft - it is believed that the degree of security afforded by the device is adequate.

No acceptably simple method is evident for overcoming the maintenance problem of removing the security bolts. Once the radio is removed, removal of the bolts with the proper tools can be accomplished in 1/2 hour or less.

CONCLUSION

The Locking Device for Vehicle Radios provides an acceptable means to prevent unauthorized removal of AN/VRC-12 family radios from military vehicles.

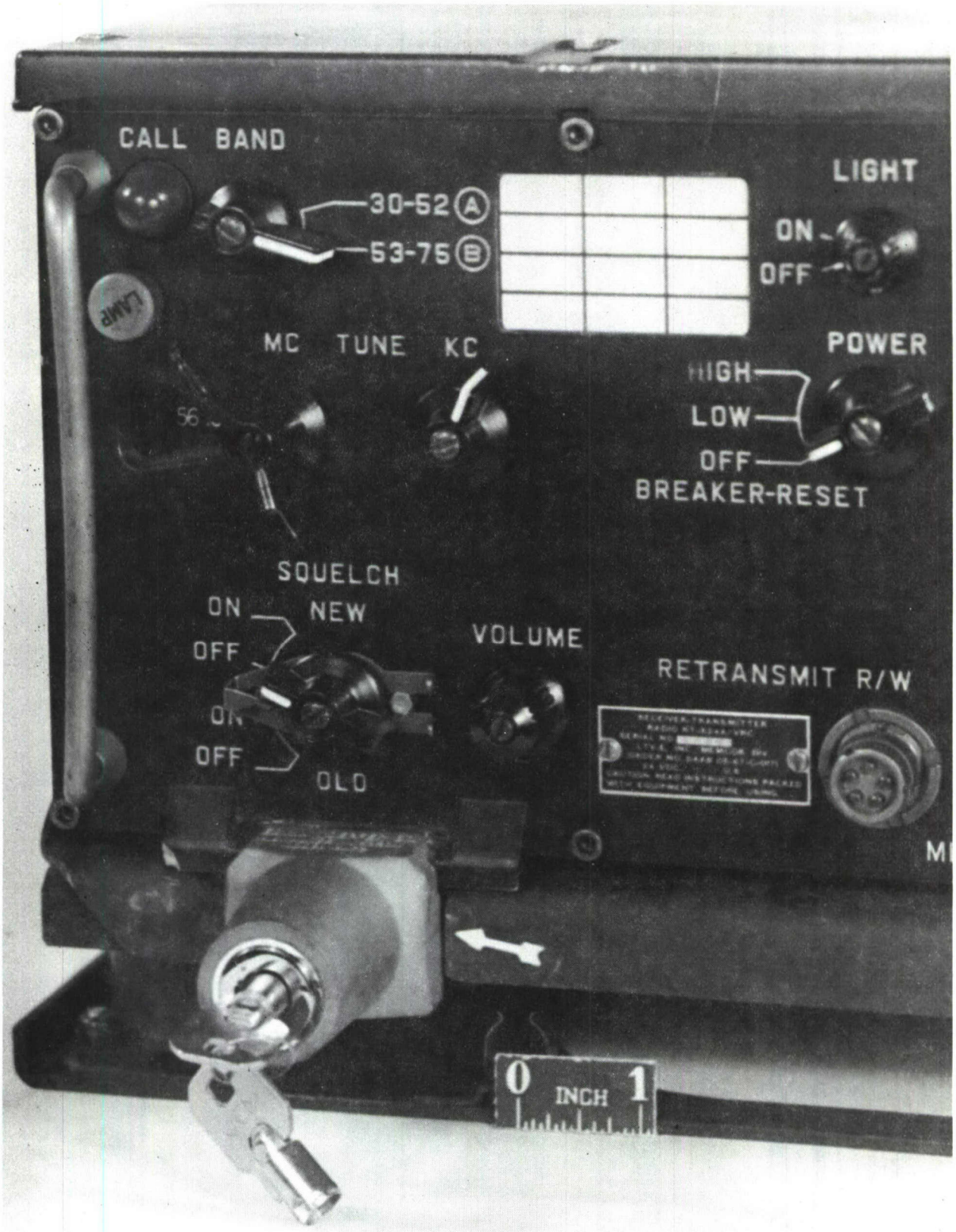

FIGURE NO. 1: Radio Locking Device Installed With AN/VRC-12 Radio

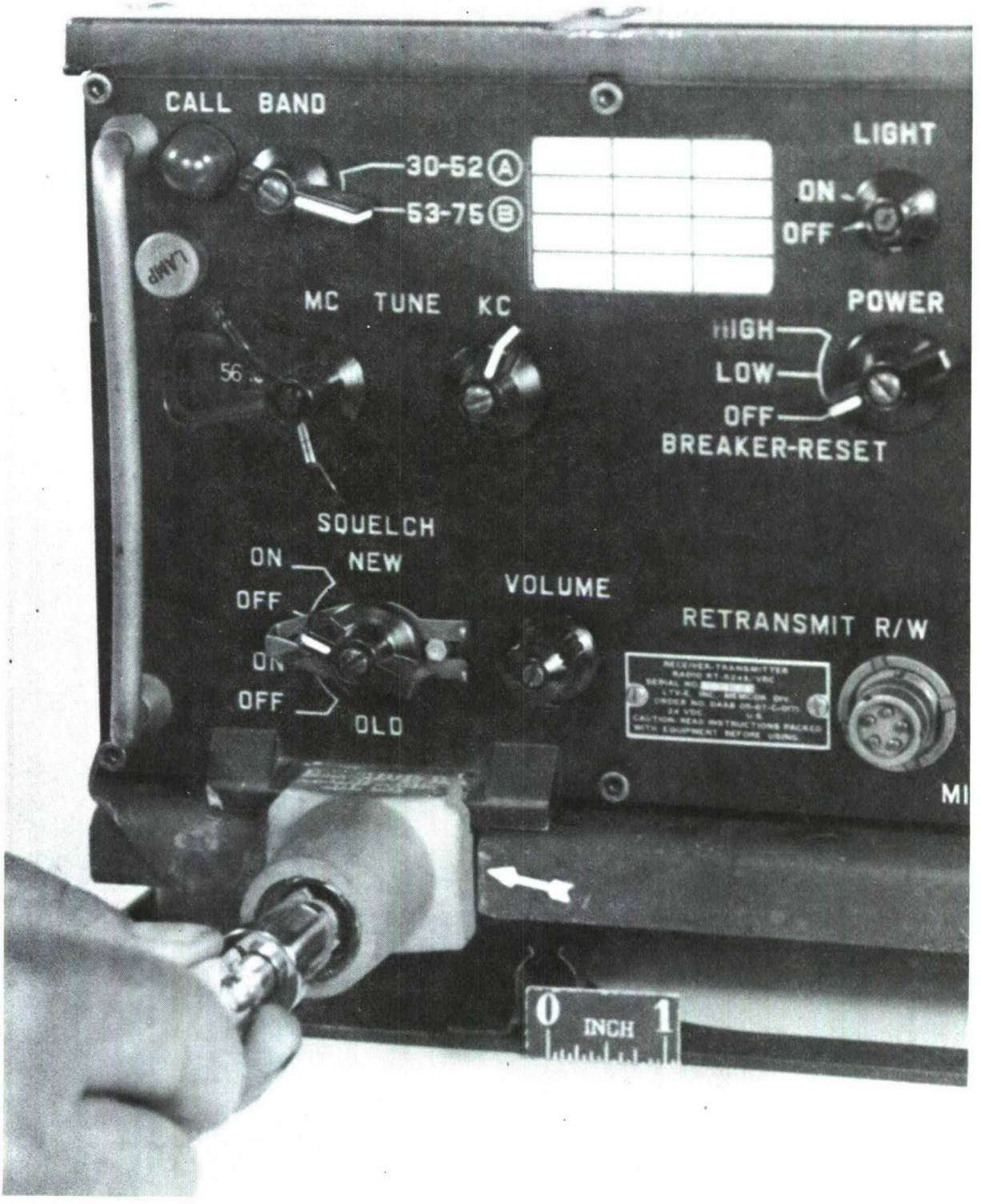

FIGURE NO. 2: Removing (or Installing) Locking Cylinder

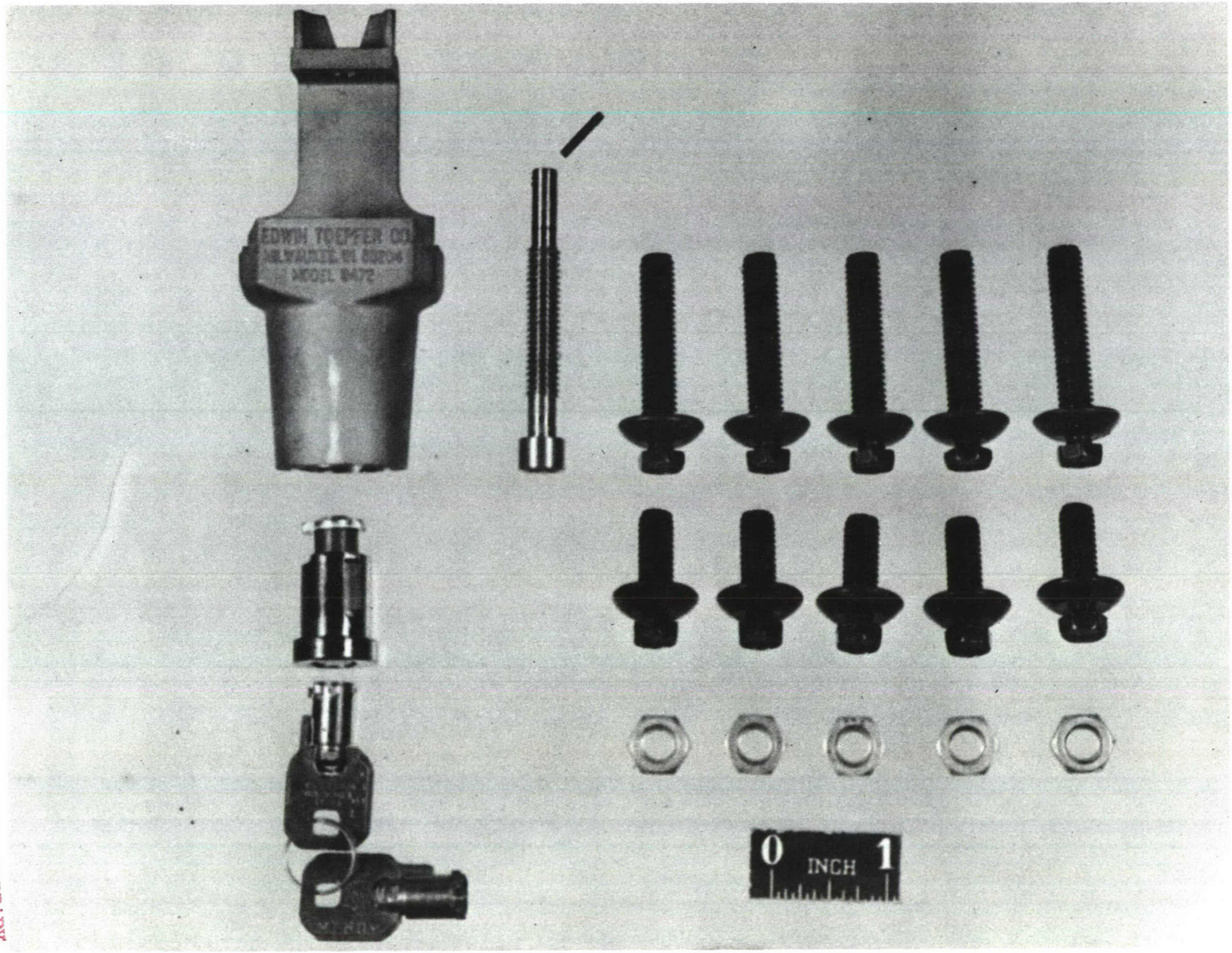

FIGURE NO. 3: Radio Locking Device Components

APPENDIX A

RADIO LOCKING DEVICE

INSTALLATION QUESTIONNAIRE

1. Dates of Installation: Week of January 2, 1974

2. Location and Unit Designation: Hanau, FRG, 3d Armored Division Artillery

3. Review the parts list. Were the locks and installation hardware received complete? Yes. List missing items: None

4. Models of vehicles on which installed. List: M151

5. Was the installation hardware furnished adequate for each vehicle? Yes. If not explain in detail _____

6. Models of radios on which locks were installed: VRC-46, VRC-49

7. Was there any misfit with any radio? No. If so, explain in detail: ___

8. Did the locks function properly? Yes. If not, explain in detail: ____

9. What was the average installation time - manhours? ½ hour

William Evans

WILLIAM EVANS, CPT
DivArty Signal Officer

RADIO LOCKING DEVICE

FINAL EVALUATION QUESTIONNAIRE

1. Do you think that the Radio Locking Device is an effective means of preventing theft or unauthorized removal of radios? Yes

2. Do you think all vehicle radio installations should use the lock? Yes
What is your recommended BOI? One per AN/VRC-12 Family of radio sets

3. What improvements to the device do you suggest? See #6

4. What form of key plan do you suggest? That is, should all keys within a unit be the same, or all different? Sets of identical keys per section

5. Is the "key retained when unlocked" a desired feature? Yes

6. Add any additional comments you wish to make: The headless bolts present a maintenance problem. When a vehicle is turned in for maintenance the radio mount is removed. If the headless bolts are used it requires drilling and using an extractor to get the mount off.

CURLEY B. KNEPP, CPT
Division Radio Officer

FORMAT FOR USER OPERATIONAL EVALUATION STATEMENT

The Radio Locking Device has been in use by Army elements in West Germany since January 1974.

Analysis of performance since that time indicates that:

1. The Radio Locking Device (is/~~is not~~) safe in operation.

2. Its reliability (is/~~is not~~) acceptable to this Command.

3. Its maintainability (is/~~is not~~) acceptable to this Command.

4. It requires (~~only~~ ~~normal~~/special) support provisions. Requires drilling and extraction to remove mount for maintenance.

5. Technical risk connected with the continued fielding of this item is (low/~~moderate~~/~~high~~).

6. The Radio Locking Device (is/~~is not~~)acceptable to this Command for operational use. It (~~satisfies~~/does not satisfy)* all requirements of this Command. Based upon its performance in this operational environment, this item (should/~~should not~~) be considered for adoption Army-wide. Recommend type classification as Standard B .

JOHN A. HOEFLING
Brigadier General, USA
Assistant Division Commander

* Security of AN/VRC 12 family of radio sets only.

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